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SHORT REPORT

Treatment of Femoral Pseudoaneurysms with Endograft in High-risk Patients

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Introduction. *Anastomotic aneurysms are a late complication after arterial reconstruction. Current treatment usually consists of open repair but we describe our experience with endovascular repair of femoral pseudoaneurysms.*
Report. *Six patients with seven femoral pseudoaneurysms were treated with percutaneously inserted endografts. Control angiography confirmed immediate technical success in all cases. Exclusion of the para-anastomotic aneurysm was obtained in all cases. No major complications or postoperative mortality were observed. No occlusions of the endografts occurred and no endoleaks were noticed.*
Discussion. *Endovascular exclusion of femoral pseudoaneurysms is feasible and reliable. Long-term follow-up will demonstrate if this approach in selected patients is justified.*

Keywords: Stent-graft; Para-anastomotic aneurysm; Endoprosthesis.

Introduction

Anastomotic aneurysms are a late complication after arterial reconstruction, and often remain a challenge to the surgeon. The true incidence of these aneurysms is not known, but is estimated between 2 and 8%.[1–3] Complications include thrombosis, embolism, rupture or compression on the adjacent structures.[2,3] Current treatment usually consists of open surgical resection of the aneurysm, and interposition of a new graft. Endovascular repair of femoral pseudoaneurysms is less invasive, and fewer complications are described.[1,2,4]

Materials and Methods

Between September 1998 and December 2003, six patients (five men; median age 77 years, range 69–79 years) with seven femoral pseudoaneurysms after previous vascular surgery were treated with stent-graft implantation. Two patients had undergone previous surgery for abdominal aortic aneurysm (AAA), one patient for AAA and concomitant true aneurysm of the common femoral artery, two patients for aorto-iliac occlusive disease and one patient for repeat endarterectomy and patch-plasty of the common femoral artery. One patient had bilateral femoral pseudoaneurysms. The aneurysms ranged in diameter from 30 to 140 mm (median 54 mm). The interval between the initial operation and treatment of the anastomotic aneurysm ranged from 3 months to 10 years (median 4.7 years). In the same time period, an additional 13 surgical repairs of femoral pseudoaneurysms were performed. The majority of these 13 patients were ASA II, with the higher-risk patients being treated by endovascular procedure. Three patients were classified as ASA III and two as ASA IV because of severe cardiac disease, chronic obstructive pulmonary disease and renal failure. One patient (ASA II), who was unwilling to undergo open surgical repair of the femoral anastomotic aneurysm, also was treated by endograft. One pseudoaneurysm in a high-risk patient with bilateral pseudoaneurysms was excluded from endovascular treatment for pseudoaneurysm on the left common femoral artery as this patient had a patent superficial and profunda femoral

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artery. This pseudoaneurysm was treated by surgical repair. The contralateral pseudoaneurysm was treated by endograft and was included in the present series.

Preoperative work-up consisted of ultrasound, CT-scan and (calibrated) arteriography or MR-angiography. Patients presenting with a femoral pseudoaneurysm were only treated by endograft if the outflow consisted of a single, undiseased vessel. The aim was to sacrifice neither the superficial nor the profunda femoral artery and all important side branches (Fig. 1).

All procedures were performed in the operating room, usually under regional anaesthesia; general anaesthesia was used in one patient. One dose of antibiotics was administered prior to the procedure. A percutaneous approach was used in all cases, using 11-F or 12-F introducers. The ipsilateral profunda femoral artery was routinely used as access site for treating pseudoaneurysm of the common femoral artery. After puncture of the profunda femoral artery under roadmapping and insertion of the sheath, 5000 units of heparin were administered.

The femoral pseudoaneurysms were treated using either Hemobahn endografts (W. L. Gore and Associates) or by a tapered iliac excluder endograft. Intraoperative angiogram confirmed exclusion of the pseudoaneurysm in all cases. Postoperatively, manual compression for about 20 min was accomplished by the operating surgeon. Mechanical compression devices were not used.

Fig. 1. Preoperative angiography showing a femoral pseudoaneurysm.

An oversizing in diameter of the endograft of 20–30% was chosen. The proximal diameters ranged from 9 to 16 mm and distal diameters from 9 to 10 mm. The length of the stent-graft was of lesser importance as the proximal end of the endograft could be deployed high up in the bypass graft, but an overlap of 1.5 cm was the minimum requirement.

Patients already on anticoagulants continued their treatment and aspirin was prescribed for other patients.

Initial follow-up consisted of regular clinical examinations and ultrasound. In one patient CT-scan was performed annually because of a concomitant pseudoaneurysm of the proximal aortic anastomosis.

Results

Immediate technical success was obtained in all cases. One stent-graft per procedure was used to exclude the pseudoaneurysm. Angiography at the end of the procedure confirmed exclusion of the para-anastomotic aneurysm in all cases (Fig. 2). No endoleak was observed, even on the delayed phase of the angiogram. Median hospital stay was 6 days (range 3–12 days).

No complications related to the procedure were observed. One important groin haematoma developed in the patient treated for ruptured anastomotic aneurysm. There was no need for transfusion in the elective cases. However, the patient treated for ruptured pseudoaneurysm was given two units of packed cells on the first postoperative day.[2]

No patients were lost to follow-up. The median duration of follow-up was 18.6 months (range 6 weeks to 4 years). At the time the present evaluation was performed, four out of six patients in the group of the femoral pseudoaneurysms had died from causes unrelated to the treatment of the pseudoaneurysm. Two patients died within the first 6 months following the procedure, whereas the survival of the third was 2.5 years, and of the fourth 4 years. The two remaining patients are still being followed. No endoleaks were noticed and no stent-graft occlusions occurred. There were no clinical signs of infection of endografts. Patients treated by endograft for femoral pseudoaneurysm did not exhibit any stent-graft deterioration on plain X-ray.

Fig. 2. Control angiography after successful exclusion of the pseudoaneurysm by insertion of an endograft.

Discussion

Femoral pseudoaneurysms are an underestimated complication after bypass surgery.[1,2] The traditional treatment is interposition of a new bypass graft. The procedure can be more difficult than the initial operation due to the scarring tissue.[2,3] Wound infections have been reported in patients treated surgically. There was no operative mortality associated with surgical repair of 13 femoral pseudoaneurysms during the same time period. However, a severe wound infection occurred in three of these patients. Moreover, in this group two patients presented with groin seroma, requiring several drainages. No positive cultures were observed.

As we still favour the surgical approach in low risk patients and patients in which an endograft would sacrifice the superficial or profound femoral artery,[1,4] we initially restricted endovascular exclusion to patients classified as ASA III or IV, having a limited life expectancy. Since, a surgical approach in these patients was considered risky, we favoured an endovascular approach to relieve them from the worry of having a pulsatile mass in the groin. Moreover, surgeons were satisfied not to be confronted with the acute complications of the pseudoaneurysms in these high-risk patients. Only in the later phase did we include a patient who was fit for open repair, who was unwilling to undergo redo surgery.

In all the patients reported in this study the outflow consisted of a healthy deep femoral artery which was wide enough to accommodate an 11 or 12 F sheath. However, puncture of the contralateral common femoral artery and insertion of a flexible endoprosthesis (e.g. Hemobahn) by the cross-over technique, through a previously placed cross-over sheath, also would be feasible.

One of the major concerns in femoral pseudoaneurysms, is the insertion of stent-grafts across the hip joint.[1] Indeed, failures have been reported in stents across the knee, or in other motion sites like the subclavian artery. Deformations, fractures and stent-graft migration due to repetitive movement and compression have been described.[1] More recently, however, only occlusions were described in the exclusion of popliteal aneurysms with highly flexible stent-grafts.[5] In the present series, no specific advice concerning flexion of the hip was given to the patients as a majority had an impaired mobility or a limited life expectancy.

To our knowledge, endovascular exclusion of femoral pseudoaneurysms has been reported in only three papers which dealt with a total of four patients, including the ruptured femoral para-anastomotic aneurysm in the present series.[1,2,4] In these studies, follow-up did not exceed 6 months,[1,2] or was not specified.[4]

We followed our patients by ultrasound or CT-scan. The need for technical examinations at regular intervals to monitor the occurrence of endoleaks represents a potential disadvantage for the patient, and can increase health care costs.

From the technical point of view, this study illustrates that, in the short term, endografts can be used to exclude a femoral para-anastomotic aneurysm. The present series suggests that femoral para-anastomotic aneurysms can be excluded successfully and occlusions are not to be expected. Further studies are needed before the indication for endovascular approach can be extended from high-risk patients to all patients with single vessel outflow.

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